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PATENT APPLICATION  
PO-7966  
LeA 35,371

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION OF )  
HARDY JÜNGERMANN ET AL ) GROUP NO.: 1714  
SERIAL NUMBER: 10/734,680 ) CONFIRMATION NO.: 1186  
FILED: DECEMBER 12, 2003 ) EXAMINER: JOSEPH D.  
ANTHONY )  
TITLE: A LEAD-FREE MIXTURE AS A )  
RADIATION PROTECTION )  
ADDITIVE )

DECLARATION UNDER 37 C.F.R. 1.132

I, Dr. Heinz Pudleiner, a resident of Bethelstrasse 39, 47800 Krefeld,  
Germany do hereby declare:

- 1) Regarding my technical education and experience:
  - a) I am a chemist, having studied chemistry at the Georg August Universität in 37073 Göttingen, Germany;
  - b) I received the degree of Doctor rer. nat. from the Georg August Universität, Germany, in 1988; and
  - c) Since July 1, 1988 I have been an employee of Bayer MaterialScience AG (formerly Bayer AG, Leverkusen, Germany), and work in the Department of Polycarbonates thereof.
- 2) I am a named Joint-Inventor in the above identified application.
- 3) During the prosecution of the above identified application, I was informed of the rejection of the claims as being unpatentable over U.S. Patent Numbers 6,548,570 and/or 3,751,387.

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- 4) The following samples were prepared, in the following manner, under my supervision and control:
  - a) Example 7, as set forth and described in the above identified application;
  - b) Example 50 Comparative

79.6 wt.% of Gadolinium oxide were added in 2-3 portions to 16.6 wt.% of a synthetic elastomer (EVM ethylene/vinylacetate copolymer with about 40 wt.% of ethylene and about 60 wt.% of vinyl acetate) (Levapren® 600 HV) and homogenized on a roller system or internal mixer. Then the following were added: 1.6 wt.% of Regal® SRF carbon black from Cabot, 0.5 wt.% of Rhenogran® P-50 anti-hydrolysis agent from Rhein-Chemie, polycarbodiimide, 0.2 wt.% of stabilizer Rhenofit® DDA styrenated diphenylamine from Rhein-Chemie, 0.2 wt.% of stearic acid, 0.6 wt.% of Rhenofit® TAC triallyl cyanurate from Rhein-Chemie and 0.7 wt.% of Polydispersion® T α,α'-bis-(tert-butylperoxy)-diisopropylbenzene, peroxide cross-linker from Rhein-Chemie. After renewed homogenization, the mixture was drawn out as a sheet on a roller or calandered. Production of the radiation-absorbing articles was achieved after pressure forming or calandering by vulcanizing at temperatures between 150°C and 170°C and was completed in 30 minutes; and

## c) Example 51 Comparative

A mixture not according to the invention was prepared from the following components:

Name	Proportion in the mixture not in accordance with the invention
Gadolinium Oxide	75 wt. %
Tungsten Powder	5 wt %
Tin Oxide	20 wt. %

Before their use, described below, gadolinium oxide and the tungsten powder were dried for 2 hours at a temperature of 120 degrees Celsius and screened through sieve 063 (tungsten through sieve 016). The gadolinium oxide, tungsten powder, and tin oxide were mixed in a tumble mixer for 1.5 hours.

A white, free-flowing, lump-free powder was thereby obtained (hereinafter "mixture not according to the invention").

66.1 wt.% of the previously prepared mixture not according to the invention were added in 2-3 portions to 27.5 wt.% of a synthetic elastomer (EVM ethylene/vinylacetate copolymer with about 40 wt.% of ethylene and about 60 wt.% of vinyl acetate) (Levapren® 600 HV) and homogenized on a roller system or internal mixer. Then the following were added: 2.8 wt.% of Regal® SRF carbon black from Cabot, 0.8 wt.% of Rhenogran® P-50 anti-hydrolysis agent from Rhein-Chemie, polycarbodiimide, 0.4 wt.% of Rhenofit® DDA styrenated diphenylamine from Rhein-Chemie, 0.3 wt.% of stearic acid, 1.0 wt.% of Rhenofit® TAC triallyl cyanurate from Rhein-Chemie and 1.1 wt.% of Polydispersion® T a,a'-bis-(tert-

butylperoxy)-diisopropylbenzene, peroxide cross-linker from Rhein-Chemie. After renewed homogenization, the mixture was drawn out as a sheet on a roller or calandered. Production of the radiation-absorbing articles was achieved after pressure forming or calandering by vulcanizing at temperatures between 150°C and 170°C and was completed in 30 minutes.

- 5) The degree of attenuation of the radiation transmission (blackening in relative units) was collected at varying levels of bulk covering,  $m_A$ , (where  $m_A = k_A \cdot p_p \cdot d_p$ , and  $k_A$  is the additive content,  $p_p$  is the density, and  $d_p$  is the thickness, i.e., bulk covering equals the proportion by weight of mixture in the sample x density of the sample x thickness of the sample) for the samples described in Paragraph 4 (Examples 7, 50, and 51) along with neat samples of Lead foil and Tungsten (plate consisting of 77% by weight of tungsten in polyamide), all of which were separately and comparably measured in accordance with the processes for such measurements as detailed and set forth in the above identified application.
- 6) I oversaw the plotting of the data obtained from the measurements of those samples set forth above. (Note: A graph of the data is attached hereto as Exhibit A, wherein the attenuation of the radiation is labeled as "x-ray transmitted" and the bulk covering,  $m_A$ , is labeled "additive per area unit [g/cm<sup>2</sup>].")

#### CONCLUSIONS

- 7) In view of the foregoing, I found it surprising and unexpected that the sample according to the invention, Example 7, demonstrated the best performance with respect to x-ray transmission attenuation as compared to Examples 50 and 51 (not in accordance with the invention) and as compared to the neat samples of Lead and Tungsten.
- 8) I further declare that all statements made herein are of my own knowledge are true and that all statements made on information and belief are believed to be

true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States code and that such willful false statements may jeopardize the validity of pending Application Serial Number 10/734,680 or any patent issuing thereon.

Signed at Uerdingen, Germany this 24 day of January, 2008.



Dr. Heinz Pudleiner

**EXHIBIT A**



